

# AON SPRINKLER CERTIFICATION



## Aon New Zealand

Aon Sprinkler Certification  
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<b>Aon Sprinkler Certification Technical Note</b>		
<b>Note Number:</b> TN17-33	<b>Issue:</b> 1	<b>Date:</b> 09/03/2017
<b>Subject</b>	<b>Diesel engine throttle controllers</b>	
Notice: Aon Sprinkler Certification Technical Notes provide guidance notes which may be used in certification of sprinkler installations by Aon New Zealand. If sprinkler installations are being certified by any other Sprinkler System Certifier, these Technical Notes may not apply.		

Mechanical forms of pressure control allowable under NZS4541 include pressure relief valves, pressure reducing valves and engine speed throttling. Each form of pressure control is subject to potential problems. Irrespective of which form of mechanical pressure control is used any sprinkler system without any pressure control is inherently more reliable and should therefore be the designers preferred outcome.

In response to the need to limit pump discharge pressures the use of a hydraulic ram to throttle the governor on the diesel engine of a fire pump has become a popular method of pressure control; more so when the pump is boosting a towns main.

### Maintenance.

Inspectors have reported several cases of throttle controllers being seized upon arrival for two yearly surveys. Testers when the engine is running need to hear the engine revolutions slow down as the throttle controller unloads and increase as the throttle controller loads up. We suggest testers need to complete the following tasks to confirm the throttle controller is acting as intended:-

- On arrival check the position of the ram. It should be retracted.
- Start the fire pump and note the ram extend.
- Operate the throttle controller test mechanism and note the engine revs increase to duty speed. Check the ram has fully retracted.
- Close the pump test return and turn off the test mechanism. The ram will extend lowering the engine revs.
- On shutting the fire pump down and returning the system to normal check that the ram is fully retracted.

To assist the industry Aon has decided to release our internal throttle controller operating procedure. Note this document is written for inspectors and includes several tests not conducted as part of a weekly pump test.

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We strongly suggest that testers are provided training and have their competency assessed with respect to diesel engines with throttle controllers. We note the process of contractor listing is being reviewed at the moment with a focus on training and competency assessment of key field staff being a likely feature.

Presently weekly pump testing is not normally subject to a formal impairment notices. However testing a fire pump with a 40mm PRV or downstream isolation valve has the effect of taking the water supply offline for the duration of the 15, or 30, minute test. We suggest contractors confirm with their customer if this increased level of impairment requires formal notification.

### Installation.

Firstly, we note that there are many throttle controllers being installed due to poor design. Poor storage K factor selection, under sizing of ranges, too far between cross mains, under sizing of the main between fire pump and alarm valve, under sizing of valves, and under sizing of the first length of main within the grid all being cases in point.

Throttle controllers as currently supplied to the market without the ability to positively disengage the ram when the pump is operating. Between the pilot valve and the ram a manual dump valve is required.

On installations that use a high pressure isolation valve downstream of the pump set to isolate the high pressure churn from the sprinkler system network all components subjected to the true churn pressure must be rated to this pressure. We note that most pump cases are rated for 16bar and fire industry specific roll groove fittings 12 bar.

On installations that use a 40mm PRV bypass test arrangement this valve needs set before the fire pump is commissioned. We discourage the use of strainers on the 40mm bypass due to the potential failure of the pump should the strainer be blocked. We note it is important to ensure the 40mm bypass is capable of passing significantly more water than the pump case cooling or diesel engine cooling lines, in some cases 40mm will not be adequate. When determining the set pressure of the 40mm PRV is should be as high as possible taking into account the fire pump churn pressure.

On commissioning testing the fire pump must be proven to produce at duty rpm the declared flow and pressure. It is not necessary to prove the pump

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boost matches the pump manufactures curve at lower flow rates with the throttle controller disconnected.

In the event the fire pump has been oversized to allow for the possibility of a declining towns mains and the discharge pressure at duty speed would exceed 1200 kPa the pump set maybe installed with the governor's set at a reduced engine speed subject to a witnessed bench test. Note in this case the engine speed must still be sufficient that the engine block heats up sufficiently to burn off carbon build up and warms the oil galleries within the block. The onsite flow test must prove the pump set is producing the reduced boost at the lower rpm when discharging duty flow.

At no point during initial commissioning nor testing should the rated pressure of any component be exceeded. We would not consider manually limiting the engine revs by holding the stop lever a safe control method for pump commissioning.

A handwritten signature in blue ink, appearing to read 'Stephen Ridder', followed by a long horizontal line extending to the right.

Stephen Ridder  
Fire Protection Consultant